

# **NIST STRUCTURAL RESEARCH PUBLICATIONS, 1984-1989**

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**U.S. DEPARTMENT OF COMMERCE  
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**U.S. DEPARTMENT OF COMMERCE  
Robert A. Mosbacher, Secretary  
NATIONAL INSTITUTE OF STANDARDS  
AND TECHNOLOGY  
Dr. John W. Lyons, Director**

**NIST**



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**May 1990**



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Robert A. Mosbacher, Secretary  
NATIONAL INSTITUTE OF STANDARDS  
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## NIST STRUCTURAL RESEARCH PUBLICATIONS, 1984-1989

### Scope

This report contains a list of research reports and papers authored or co-authored by members of the Structures Division, Center for Building Technology (CBT), National Institute of Standards and Technology (NIST) [formerly the National Bureau of Standards (NBS)] during the period, 1984 - 1989. Reports prepared under grants or contracts for the Structures Division are also listed.

### Subject Categories

Publications are listed in one of the following subject categories:

- o Concrete
- o Construction Safety
- o Earthquake Engineering
- o Geotechnical Engineering
- o Masonry
- o Miscellaneous
- o Nondestructive Testing
- o Offshore Structures
- o Probability Theory
- o Steel
- o Structural Dynamics
- o Structural Investigations
- o Wind Engineering

Some reports or papers may contain subject matter pertaining to more than one category. Hence, the reader should also use the keyword index (pages 36 - 50) to locate reports of interest.

The NIST/NBS report index (pages 34 & 35) may be used to determine report titles, etc. if the report designation number is known.

Information concerning any of the publications listed herein or current NIST structural research activities may be obtained by contacting:

Structures Division  
Center for Building Technology  
National Institute of Standards and Technology  
Building 226, Room B168  
Gaithersburg, MD 20899  
(301) 975-6061

## **Availability and Ordering Information**

### NIST/NBS Reports

NIST/NBS reports are generally available for purchase from either the Government Printing Office (GPO) or the National Technical Information Service (NTIS).

NIST publications cited with stock numbers (SN) such as a Technical Note (TN) or Building Science Series (BSS) may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. GPO will accept payment by check, money order, VISA, MasterCard, or deposit account. For availability and price, write to GPO or telephone (202) 783-3238. Should an NIST publication be out of print at the GPO, its continued availability is assured at NTIS which sells publications in microfiche or paper copy reproduced from microfiche.

NTIS documents, i.e., the NISTIR/NBSIR series or NIST/NBS - GCR series, can be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. NTIS will accept payment by check, money order, VISA, American Express, MasterCard, or deposit account. For price or other information, call (703) 487-4650.

### Non-NIST Published Material

Papers or reports not published by NIST may be available directly from the author or from the external publisher cited. Such papers are not for sale by either the GPO or NTIS.



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# Concrete

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- C-1      **Behavior of Post-Tensioned Girder Anchorage Zones**, W.C. Stone, J.E. Breen, *Journal, Prestressed Concrete Institute*, Vol. 29, No. 1, pp. 64-109 (Jan-Feb 1984).

Keywords: anchorage zone, box girders, cracking, full-scale tests, laboratory tests, post-tensioning, models.

- C-2      **Comparison of Analytical with Experimental Internal Strain Distributions for the Pullout Test**, W.C. Stone, N.J. Carino, *ACI Journal*, Vol. 81, No. 1, pp. 3-12 (Jan-Feb 1984).

Keywords: cracking, finite element analysis, internal strain, nondestructive testing, pullout tests, strength, stress analysis.

- C-3      **Design of Post-Tensioned Girder Anchorage Zones**, W.C. Stone, J.E. Breen, *Journal, Prestressed Concrete Institute*, Vol. 29, No. 2, pp. 28-61 (Mar-Apr 1984).

Keywords: anchorage zone, box girders, codes, concrete, cracking, design, post-tensioning, reinforcement.

- C-4      **Discussion - Deformation and Failure in Large-Scale Pullout Tests**, W.C. Stone, N.J. Carino, *ACI Journal*, Vol. 81, No. 5, pp. 532-534 (Sep-Oct 1984).

Keywords: aggregate interlock, failure mechanism, geometry, pullout test.

- C-5      **The Maturity Method: Theory and Application**, N.J. Carino, *Cement, Concrete, and Aggregates*, ASTM, Vol. 6, No. 2, pp. 61-73 (Winter 1984).

Keywords: activation energy, concrete, equivalent age, maturity, nondestructive testing, strength.

- C-6      **The Effect of Geometry and Aggregate on the Reliability of the Pullout Test**, W.C. Stone, B.J. Giza, *Concrete International: Design and Construction*, ACI, Vol. 7, No. 2, pp. 27-36 (Feb 1985)

Keywords: aggregates, concrete, nondestructive testing, pullout test, reliability, strength.

- C-7     **A New Statistical Method for Prediction of Concrete Strength from In-Place Tests**, W.C. Stone, C.P. Reeve, *Cement, Concrete, and Aggregates*, ASTM, Vol. 8, No. 1, pp. 3-12 (Summer 1986).
- Keywords: compressive strength, concrete, construction, correlation, data processing, in-place strength, statistics, strength, strength prediction.
- C-8     **Statistical Methods for In-Place Strength Predictions by the Pullout Test**, W.C. Stone, N.J. Carino, C.P. Reeve, *ACI Journal*, Vol. 83, No. 5, pp. 745-755 (Sep-Oct 1986).
- Keywords: aggregates, compressive strength, concrete construction, lightweight aggregates, pullout tests, regression analysis, statistics, strength.
- C-9     **Reinforcement Buckling in Reinforced Concrete Flexural Members**, C. Scribner, *ACI Journal*, Vol. 83, No. 6, pp. 966-973 (Dec 1986).
- Keywords: reinforcement buckling, reinforced concrete, flexural member.
- C-10    **Analysis of In-Place Test Data with Spreadsheet Software**, N.J. Carino, W.C. Stone, *Computer Use for Statistical Analysis of Concrete Test Data*, SP-101, ACI, pp. 1-26 (May 1987).
- Keywords: concrete, construction, data analysis, in-place strength, personal computer, safety, statistics, software.
- C-11    **Finite-Element Analysis of the Pullout Test Using a Nonlinear Discrete Cracking Approach**, A.K. Hellier, M. Sansalone, N.J. Carino, W.C. Stone, A.R. Ingraffea, *Cement, Concrete, and Aggregates*, ASTM, Vol. 9, No. 1, pp. 20-29 (Summer 1987).
- Keywords: aggregate interlock, concrete, cracks, discrete crack model, finite element analysis, fracture mechanics, pullout tests .
- C-12    **Flexural and Shear Behavior Reinforced Concrete Beams during Fire Tests**, Final Report, T.N. Lin, B. Ellingwood, O. Piet, NBS GCR 87-536, 104 pages (Nov 1987), NTIS No. PB88-155817.
- Keywords: beams, fire, flexural strength, reinforced concrete, shear strength.

- C-13     **Literature Review of Strengthening Methodologies of Existing Structures**, L.T. Phan, H.S. Lew, M.K. Johnson, NBSIR 88-3796, 126 pages (Jun 1988), NTIS No. PB88-218219.
- Keywords: anchors, beams, columns, deflection envelopes, ductility, epoxy adhesive, hysteresis curves, in-fill walls, lateral loads, lateral stiffness, reinforced concrete frames, strengthening, steel braces, wingwalls, walls.
- C-14     **Literature Review of Post-Installed Anchorage in Concrete**, M.K. Johnson, H.S. Lew, L.T. Phan, NBSIR 88-3797, 66 pages (Jun 1988), NTIS No. PB88-217237.
- Keywords: anchors, combined loading, concrete, drilled-in anchor, epoxy anchor, expansion anchor, grouted anchor, post-installed anchor, shear, tension.
- C-15     **Introduction to ACI 306.1-87: Specification for Cold Weather Concreting**, N.J. Carino, *Concrete International: Design and Construction*, ACI, Vol 10, No 10, pp. 50-57, (Oct 1988).
- Keywords: cold weather, concrete, construction, freezing specification, specification.
- C-16     **Minimum Shear Reinforcement in Beams with Higher Strength Concrete**, M.K. Johnson, J.A. Ramirez, *ACI Structural Journal*, Vol. 86, No. 4, pp. 376-382 (Jul 1989).
- Keywords: beams, concrete, shear reinforcement, strength.
- C-17     **Statistical Characteristics of New Pin Penetration Test**, N.J. Carino, R.C. Tank, *Cement, Concrete and Aggregates*, ASTM, Vol. 11, No. 2, pp. 100-108 (Winter 1989).
- Keywords: compressive strength, concrete, correlation, in-situ testing, penetration tests, variability.
- C-18     **Properties of Concrete at Early Ages**, N.J. Carino, H.J.M. Jennings, L.M. Snell, *Cement, Concrete and Aggregates*, ASTM, Vol. 11, No. 2, pp. 129-131 (Winter 1989).
- Keywords: concrete, microstructure, research, standards, temperature.

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# Construction Safety

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- CS-1     **Implementation of Compressible Shoring Analysis for Multistory Concrete Construction**, J.L. Gross, NBSIR 84-2964, 61 pages (Dec 1984), NTIS No. PB85-159960.

Keywords: buildings, computer models, concrete construction, formwork, reinforced concrete, safety, structural analysis.

- CS-2     **Construction Loads and Load Effects in Concrete Building Construction**, H.S. Lew, *Concrete International: Design and Construction*, ACI, Vol. 7, No. 4, pp. 20-23 (Apr 1985).

Keywords: building codes, concrete construction, formwork, loads, multistory buildings, standards.

- CS-3     **Analysis of Shoring Loads and Slab Capacity for Multistory Concrete Construction**, J.L. Gross, H.S. Lew, *Proceedings*, 2nd International Conference on Forming Economical Concrete Buildings, Chicago, IL, November 28-30, 1984, SP-90, ACI, pp. 109-130 (1986).

Keywords: computer programs, concrete construction, concrete slabs, formwork, loads, microcomputers, multistory buildings, reinforced concrete, safety, shoring, structural analysis.

- CS-4     **Perimeter Safety Net Projection Requirements**, C.W.C. Yancey, N.J. Carino, M. Sansalone, NBSIR 85-3271, 61 pages (May 1986), NTIS No. PB86-212073.

Keywords: construction safety, falling bodies, fall trajectory, safety nets, simulated falls.

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# Earthquake Engineering

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- EE-1      **Sites and Services Projects in Seismic Regions**, E. Simiu, *Journal of Architectural and Planning Research*, Vol. 1, No. 3, pp. 175-180 (Jan 1984).

Keywords: seismic regions.

- EE-2      **Dynamic Stability of Structures Subjected to Seismic Shear Waves**, S.T. Wu, C.G. Culver, *Proceedings, Annual Technical Session - Structural Stability Research Council: Stability under Seismic Loading*, San Francisco, CA, April 10-11, 1984, pp. 169-175 (1984).

Keywords: analytical study, earthquakes, stability.

- EE-3      **Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities**, W.D. Kovacs, E.V. Leyendecker, J.S. Leiss, L.A. Lister, NBSIR 84-2833, 52 pages (Jun 1984), NTIS No. PB85-121465 .

Keywords: data requirements, federal agencies, LNG facilities, seismic design, site investigation.

- EE-4      **Earthquake Hazard Mitigation Through Improved Seismic Design**, C.G. Culver, *Proceedings, Workshop on Geologic Hazards in Puerto Rico*, April 4-6, 1984 (Jul 1984).

Keywords: analytical study, earthquakes, standards.

- EE-5      **Earthquake Resistant Design Criteria**, C.G. Culver, *Proceedings, Workshop on Earthquake Hazards in Virgin Islands Region*, April 9-10, 1984 (Jul 1984).

Keywords: analytical study, earthquakes, standards.

- EE-6      **Guidelines for ICSSC Post-Earthquake Response Activities**, R.D. Marshall, NBSIR 85-3123, 81 pages (Mar 1985). Not available NTIS.

Keywords: buildings, codes, design criteria, disasters, earthquakes, seismicity, structural engineering.

- EE-7      **Workshops Convened by the Interagency Committee on Seismic Safety in Construction during 1984**, E.V. Leyendecker, G.E. Turner, S.G. Fattal, NBSIR 85-3161, 44 pages (May 1985), NTIS No. PB85-227486.

Keywords: buildings, codes, earthquakes, existing buildings, Federal Workshops, lifelines, seismic zoning, standards.

- EE-8     **Wind and Seismic Effects, *Proceedings***, Joint Panel Meeting of the U.S.-Japan Cooperative Program in Wind and Seismic Effects (17th), Tsukuba, Japan, May 21-24, 1985, N.J. Raufaste, Editor, NBSIR 86-3364, 740 pages (May 1986), NTIS No. PB87-199964.
- Keywords:    accelerograph, codes, design criteria, disasters, earthquakes, earthquake hazards, geotechnical engineering, ground failures, US-Japan Panel.
- EE-9     **Plan for a Design Study for a National Earthquake Engineering Experimental Facility**, C.F. Scribner, E.V. Leyendecker, NBSIR 86-3453, 25 pages (Oct 1986), NTIS No. PB89-114714.
- Keywords:    buildings, earthquakes, laboratories, research, structural engineering, testing.
- EE-10    **Preliminary Dynamic Analysis of the Ministry of Agriculture Building**, W.C. Stone, N. Rodriguez-Cuevas, *Proceedings*, International Conference on Mexico Earthquakes: Factors Involved and Lessons Learned, ASCE, NY, NY, pp. 233-254 (Oct 1986).
- Keywords:    dynamic analysis, earthquakes.
- EE-11    **Behavior of 1/6-Scale Model Bridge Columns Subjected to Cyclic Inelastic Loading**, G. S. Cheok, W. C. Stone, NBSIR 86-3494, 292 pages (Nov 1986), NTIS No. PB87-152245.
- Keywords:    bridges, columns, computer graphics, cyclic loading, plastic hinges, scale models.
- EE-12    **Seismic Design Guidelines for Federal Buildings.** E.V. Leyendecker, Editor, NBSIR 87-3524, 103 pages, also published as Interagency Committee on Seismic Safety in Construction Report No. ICSSC/RP/1, (Feb 1987), NTIS No. PB87-161204.
- Keywords:    building codes, minimum design loads, seismic design, standards.
- EE-13    **National Earthquake Engineering Experimental Facility Study. Phase One. Large Scale Testing Needs**, C.F. Scribner, C.G. Culver, NBS SP-729, 76 pages (Apr 1987), SN 003-003-02795-2.
- Keywords:    buildings, earthquakes, laboratories, research, structural engineering, testing.



- EE-14 **Wind and Seismic Effects, *Proceedings***, Joint Meeting of the U.S.-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects (18th), Gaithersburg, MD, May 12-15, 1986, N.J. Raufaste, Editor, NBSIR-87/3540, 488 pages (Apr 1987), NTIS No. PB87-199972.

Keywords: accelerograph, codes, design criteria, disasters, earthquakes, earthquake hazards, geotechnical engineering, ground failures, liquefaction, pipeline, seismicity, standards, structural engineering, structural response, tsunami, US-Japan Panel, wind loads, winds.

- EE-15 **Large Scale Bridge Column Tests: A Progress Report**, E.V. Leyendecker, W.C. Stone, G.S. Cheok, *Proceedings*, Joint Meeting of the U.S.-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects (18th), Gaithersburg, MD, May 12-15, 1986; NBSIR 87-3540, pp. 173-181 (Apr 1987).

Keywords: bridges, columns, large scale, testing.

- EE-16 **Earthquake Damage in Mexico Caused by the September 1985 Earthquake**, E.V. Leyendecker, W.C. Stone, F.Y. Yokel, *Proceedings*, Joint Meeting of the U.S.-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects (18th), Gaithersburg, MD, May 12-15, 1986; NBSIR 87-3540, pp. 357-367 (Apr 1987).

Keywords: damage, earthquakes.

- EE-17 **Engineering Aspects of the 1985 Mexico Earthquake**, W.C. Stone, F.Y. Yokel, M. Celebi, T. Hanks, E.V. Leyendecker, NBS BSS-165, 228 pages (May 1987), NTIS No. PB87-210191, SN 003-003-02803-7.

Keywords: building codes, earthquakes, foundation, geology, geotechnical engineering, ground motion, response spectra, seismology.

- EE-18 **Inelastic Behavior of 1/6-Scale Model Bridge Columns Subjected to Cyclic Loading**, G.S. Cheok, W.C. Stone, H.S. Lew, *Proceedings*, Third U.S.-Japan Workshop on Bridge Engineering (May 1987).

Keywords: bridges, columns, cyclic loading, inelastic behavior.

- EE-19 **The Whittier Narrows Earthquake of October 1, 1987: A Reconnaissance Report**, H.S. Lew, NBSIR 87-3667, 36 pages (Nov 1987), NTIS No. PB88-130331.

Keywords: bridges, buildings, earthquakes, highways, housing, seismic design, structural engineering.

- EE-20 **Guidelines and Procedures for Implementation of Executive Order on Seismic Safety**, C.W.C. Yancey, J. Greenberg, NBSIR 88-3711, 32 pages, (Jan 1988), also published as Interagency Committee on Seismic Safety in Construction Report No. ICSSC/RP/2, NTIS No. PB89-148092.

Keywords: buildings, earthquake hazards, federal agencies, lifelines, seismic safety.

- EE-21 **Wind and Seismic Effects, Proceedings**, Joint Panel Meeting of the U.S.-Japan Cooperative Program in Natural Resources (19th), Tsukuba, Japan, May 12-15, 1987, N.J. Raufaste, Editor, NBSIR 88-3703, 433 pages (Jan 1988), NTIS No. PB88-183983.

Keywords: accelerograph, bridges, codes, concrete, design criteria, disasters, earthquakes, earthquake hazards, earthworks, geotechnical engineering, ground failures, liquefaction, masonry, pipeline, repair and retrofit, seismicity, standards, storm surge, structural engineering, tsunami, US-Japan Panel, wind loads.

- EE-22 **Inelastic Behavior of Full-Scale Bridge Columns Subjected to Cyclic Loading**, W.C. Stone, G.S. Cheok, NBSIR 88-3788, 261 pages (May 1988). Not available NTIS.

Keywords: axial load, bridges, columns, concrete, confinement, cyclic loading, ductility, energy absorption, failure, full-scale, lateral loads, microconcrete, modeling, plastic hinges, scale effects.

- EE-23 **Simulation Studies of Prototype and 1/6-Scale Model Bridge Columns Under Reversed Cyclic Loading**, W.C. Stone, G.S. Cheok, H.S. Lew, *Proceedings*, Fourth U.S.-Japan Workshop on Bridge Engineering (May 1988).

Keywords: bridges, columns, cyclic loading, earthquake loads, full-scale, inelastic behavior, models, reinforced concrete, seismic loads.

- EE-24 **Wind and Seismic Effects, Proceedings**, Joint Panel Meeting of the U.S.-Japan Cooperative Program in Natural Resources (20th), Gaithersburg, MD, May 17-18, 1988, N.J. Raufaste, Editor, NIST SP-760, 481 pages (Jan 1989), NTIS No. PB89-154335, SN 003-003-02917-3.

Keywords: accelerograph, codes, design criteria, disasters, earthquakes, earthquake hazards, geotechnical engineering, ground failures, liquefaction, pipeline, risk analysis, seismicity, standards, structural engineering, structural response, tsunami, US-Japan Panel, wind loads, winds.



EE-25     **Similitude Studies of Prototype and 1/6-Scale Model Bridge Columns Under Reversed Cyclic Loading**, W.C. Stone, G.S. Cheok, H.S. Lew, *Proceedings*, Panel on Wind and Seismic Effects, 20th U.S.-Japan Joint Meeting, NIST SP-760, pp. 143-167 (Jan 1989).

Keywords: bridges, columns, cyclic loading, earthquake loads, full-scale, inelastic behavior, models, reinforced concrete, seismic loads.

EE-26     **U.S. Side: Accomplishments and Challenges**, N.J. Raufaste, R.N. Wright, *Proceedings*, Panel on Wind and Seismic Effects, 20th U.S.-Japan Joint Meeting, NIST SP-760, pp. 351-364, (Jan 1989).

Keywords: earthquakes, seismicity, storm surge, US-Japan Panel, wind loads.

EE-27     **Inelastic Behavior of Full-Scale Bridge Columns Subjected to Cyclic Loading**, W.C. Stone, G.S. Cheok, NIST BSS-166, 261 pages (Jan 1989), SN 003-003-02925-4.

Keywords: axial load, bridges, columns, concrete, confinement, cyclic loading, ductility, energy absorption, failure, full-scale, lateral loads, microconcrete, modeling, plastic hinges, scale effects.

EE-28     **Guidelines for Identification and Mitigation of Seismically Hazardous Existing Federal Buildings**, H.S. Lew, C.W.C. Yancey, NISTIR 89-4062, 16 pages (Mar 1989), NTIS No. PB89-188627

Keywords: buildings, earthquakes, earthquake hazards, existing buildings, federal agencies, guidelines, mitigation, seismic safety, strengthening.

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# Geotechnical Engineering

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- G-1      **Pore Pressure Buildup in Resonant Column Tests**, R.M. Chung, F.Y. Yokel, H. Weschler, *ASCE Journal of Geotechnical Engineering*, Vol. 10, No. 2, pp. 247-261 (Feb 1984).
- Keywords:   laboratory study, liquefaction, sand.
- G-2      **The Proposed ASCE Standard on Pile Foundations**, M.T. Davisson, M. Fuller, W.S. Garder, F.Y. Yokel, ASCE Preprint 84-018 (May 1984).
- Keywords:   analytical study, pile foundations, soil, standards.
- G-3      **Evaluation of Dynamic Properties of Sands by Resonant Column Testing**, R.M. Chung, F.Y. Yokel, V.P. Drnevich, *Geotechnical Testing Journal*, ASTM, Vol. 7, No. 2, pp. 60-69 (Jun 1984).
- Keywords:   earthquakes, laboratory study, sand, soil.
- G-4      **Volume Change of Sand Deposits Subjected to Cyclic Shear**, R.M. Chung, F.Y. Yokel, *Proceedings*, 8th World Conference on Earthquake Engineering, Earthquake Engineering Research Institute, Vol. 3, pp. 285-290 (Jul 1984).
- Keywords:   earthquakes, laboratory study, liquefaction, sand.
- G-5      **Liquefaction Potential and the International SPT**, W.D. Kovacs, F.Y. Yokel, L.A. Salomone, R.D. Holtz, *Proceedings*, 8th World Conference on Earthquake Engineering, Earthquake Engineering Research Institute, Vol. 3, pp. 263-268 (Jul 1984).
- Keywords:   field study, soil, standards.
- G-6      **Field Evaluation of SPT (Standard Penetration Test) Energy, Equipment, and Methods in Japan Compared with the SPT in the United States**, W.D. Kovacs, L.A. Salomone, NBSIR 84-2910, 75 pages (Aug 1984), NTIS No. PB85-104123.
- Keywords:   energy measurement, field tests, in-situ testing, liquefaction, soil mechanics, SPT, standard penetration test.
- G-7      **Influence of Soil Type and Gradation on the Thermal Resistivity of Soils**, L.A. Salomone, F.Y. Yokel, H. Weschler, NBSIR 84-2935, 39 pages (Oct 1984), NTIS No. PB85-128130.
- Keywords:   compaction, gradation, heat flow, laboratory tests, soil moisture, soil tests, soil, testing, thermal conductivity, thermal resistivity.

- G-8      **Size Effect in Simple Shear Testing**, M.I. Amer, M.S. Aggour, W.D. Kovacs, NBS GCR 84-478, 65 pages (Oct 1984), NTIS No. PB85-137719.
- Keywords: damping, earthquakes, experimental study, finite element analysis, sand, shear modulus, shear, soil dynamics.
- G-9      **Helical Probe Tests for Shallow Soil Exploration**, F.Y. Yokel, P.W. Mayne, NBSIR 86-3351, 60 pages (Jan 1986). Not available NTIS..
- Keywords: construction supervision, field test equipment, helical augers, in-situ measurements, penetration tests, residual soils, soil investigation, soil mechanics.
- G-10     **Study of Reverse Torque Ratio in the Helical Probe Test**, K.Y. Chung, F.Y. Yokel, NBSIR 86-3423, 27 pages, (Sep 1986), NTIS No. PB87-103297.
- Keywords: construction supervision, field test equipment, helical augers, in-situ measurements, penetration tests, soil investigation, testing.
- G-11     **Effect of Blow Count on Energy Transfer in SPT (Standard Penetration Test)**, F.Y. Yokel, NBSIR 88-3765, 23 pages (Jul 1988), NTIS No. PB88-239785.
- Keywords: boring, energy transfer, field tests, in-situ testing, soil sampling, standard penetration test.
- G-12     **Helical Probe Tests: Initial Test Calibration**, F.Y. Yokel, P.W. Mayne, *Geotechnical Testing Journal*, ASTM, Vol. 11, No. 3, pp. 179-186 (Sep 1988).
- Keywords: compaction, construction supervision, field tests, helical augers, penetration tests, soil investigation, soil mechanics, testing.
- G-13     **Pore Water Pressure Buildup in Clean Sands Because of Cyclic Straining**, R.S. Ladd, R. Dobry, P. Dutko, F.Y. Yokel, R. Chung, *Geotechnical Testing Journal*, ASTM, Vol. 12, No. 1, pp. 77-86 (Mar 1989).
- Keywords: cyclic strain, damping, earthquakes, laboratory tests, liquefaction, pore water pressure, sand, shear modulus, shear strain, threshold shear strain.
- G-14     **Site Characterization for Radon Source Potential**, F.Y. Yokel, NISTIR 89-4106, 62 pages (Jun 1989), NTIS No. PB89-209274.
- Keywords: convective flow, diffusion, in-situ measurements, soil investigation, permeability, porous media, radium concentration, radon, radon source potential.

G-15     **Energy Transfer Mechanism in SPT**, F.Y. Yokel, *ASCE Journal of Geotechnical Engineering*, Vol. 13, No. 9, pp. 1331-1336 (Sep 1989).

Keywords:   energy transfer, standard penetration test.

# **Masonry**

- M-1      **Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls**, K. Woodward, F. Rankin, NBSIR 84-2929, 62 pages (Oct 1984), NTIS No. PB85-119337.

Keywords: axial load, concrete block, masonry, shear, structural testing, walls.

- M-2      **Influence of Aspect Ratio on Shear Resistance of Concrete Block Masonry Walls**, K. Woodward, F. Rankin, NBSIR 84-2993, 65 pages (Jan 1985). Not available NTIS.

Keywords: aspect ratio, compression, concrete block, masonry, shear, strength, structural testing, walls.

- M-3      **Influence of Block and Mortar Strength on Shear Resistance of Concrete Block Masonry Walls**, K. Woodward, F. Rankin, NBSIR 85-3143, 74 pages (Apr 1985), NTIS No. PB85-200087.

Keywords: axial stress, concrete block, failure, masonry, mortar, shear, strength.

- M-4      **Influence of Mortar Bedding on Masonry Prism Behavior**, P. Gaynor, K. Woodward, C. Scribner, NBSIR 86-3467, 69 pages (Feb 1987), NTIS No. PB87-152310.

Keywords: masonry, mortar, prism.

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# Miscellaneous

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- MS-1     **The NBS Tri-Directional Test Facility**, K. Woodward, F. Rankin, NBSIR 84-2879, 44 pages (May 1984), NTIS No. PB84-217462.

Keywords:   actuators, computer based, hydraulic, seismic loads, servo-controlled, structural testing, test facility, three dimensional.

- MS-2     **Ring-on-Ring Tests and Load Capacity of Cladding Glass; Final report**, E. Simiu, D.A. Reed, C.W.C. Yancey, J.W. Martin, E.M. Hendrickson, A.C. Gonzalez, M. Koike, J.A. Lechner, M.E. Batts, NBS BSS-162, 64 pages (Aug 1984), NTIS No. PB85-106391, SN 003-003-02605-1.

Keywords:   buildings, engineering mechanics, failure, fracture mechanics, glass, loads, probability theory, ring-on-ring tests, strength.

- MS-3     **Dynamic Effects of Liquids in Liquid-Shell Systems**, L.T. Phan, *Proceedings*, Fifth ASCE Engineering Mechanics Division Specialty Conference (Aug 1984).

Keywords:   dynamic effects, liquid-shell systems.

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- N-2      **Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method**, N.J. Carino, *In-Situ/Nondestructive Testing of Concrete*, V.M. Malhotra, Editor, SP-82, ACI, pp. 557-579 (1984).
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- N-4      **Flaw Detection in Concrete and Heterogenous Materials using Transient Stress Waves**, M. Sansalone, N.J. Carino, N.N. Hsu, *Journal of Acoustic Emission*, Vol. 5, No. 3, pp. 524-527 (Jul-Sep 1986).
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- Keywords: concrete, fast Fourier transform, frequency analysis, impact, impact-echo method, nondestructive testing, wave propagation.



- N-7      **Measurement of the Setting Time and Strength of Concrete by the Impact-Echo Method**, S.P. Pessiki, N.J. Carino, NBSIR 87-3575, 122 pages (Jul 1987), NTIS No. PB88-111851.
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- N-10     **Transient Impact Response of Thick Circular Plates**, M. Sansalone, N.J. Carino, *Journal of Research*, National Bureau of Standards, Vol. 92, No. 6, pp. 355-367 (Nov-Dec 1987).
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- N-14      **Impact-Echo Method: Detecting Honeycombing, the Depth of Surface-Opening Cracks, and UngROUTED Ducts**, M. Sansalone, N.J. Carino, *Concrete International: Design and Construction*, ACI, Vol. 10, No. 4, pp. 38-46 (Apr 1988).
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- N-18      **Detecting Delaminations in Concrete Slabs With and Without Overlays Using the Impact-Echo Method**, M. Sansalone, N.J. Carino, *ACI Materials Journal*, V. 86, No. 2, pp. 175-184 (Mar-Apr 1989).
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- 0-2      **Structural Reliability Fundamentals and Their Application to Offshore Structures**, E. Simiu, C.E. Smith, NBSIR 84-2921, 32 pages (Sep 1984), NTIS No. PB85-109809.
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- 0-3      **Practice Approximations of Peak Wave Forces**, M. Grigoriu, B. Alibe, NBS GCR 84-481, 60 pages (Nov 1984), NTIS No. PB85-138592.
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- 0-4      **Application of Risk Analysis to Offshore Oil and Gas Operations - Proceedings of an International Workshop**, Gaithersburg, Maryland, March 27 - 28, 1984, F. Y. Yokel, E. Simiu, Editors, NBS SP-695, 213 pages (May 85), NTIS No. PB85-232544, SN 003-003-02650-6.
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- O-7      **Punching Shear Resistance of Lightweight Concrete Offshore Structures for the Arctic: Planning of Experimental Study**, L.T. Phan, H.S. Lew, D.I. McLean, R.N. White, NBSIR 86-3440, 54 pages (Sep 1986). Not available NTIS.
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- Keywords: compliant platforms, ocean engineering, offshore platforms, structural engineering, tension leg platforms, turbulence, wave loads, wind loads.
- O-10     **Mat Foundations for Offshore Structures in Arctic Regions**, F. Y. Yokel, R. G. Bea, NBSIR 86-3419, 152 pages, (Feb 87), NTIS No. PB87-171500.
- Keywords: artificial islands, geotechnical engineering, ice forces, mat foundations, ocean engineering, offshore platforms, oil production, sand and gravel berms, soil investigation, soil tests.
- O-11     **Dynamics and Reliability of Compliant Drilling and Production Platforms**, E. Simiu, NBS Letter Report (Apr 1988). Not available NTIS.
- Keywords: dynamics, reliability, compliant platforms, production platforms.
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- Keywords: loads, probability, reliability, snow, standards, structural engineering.
- P-2      **Probability Based Load Combination Criteria for Design of Shear Wall Structures**, H. Hwang, K. Nakai, M. Reich, B. Ellingwood, M. Shinozuka, NUREG/CR-4238, 43 pages (Jan 1986).
- Keywords: design, limit states, loads, reinforced concrete, reliability, standards, structural engineering.
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- P-4      **Environmental Load Direction and Reliability Bounds**, E. Simiu, S. D. Leigh, W. A. Nolan, V. Kandsamy, *Journal of Structural Engineering*, ASCE, Vol. 112, No.5, pp. 1199-1203 (May 1986).
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Keywords:   analytical study, cladding glass, wind loads.

- SD-2     **Disturbance Propagation Approach to the Dynamic Characterization of Linear Flexible Structures**, A.S. Carasso, E. Simiu, *Proceedings*, First National Structural Engineering Conference, Melbourne, Australia, pp.341-344 (Aug 1987).

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- SD-3     **Estimation of Dynamic Green's Functions for Large Space Structures by Pulse Probing and Deconvolution**, A.S. Carasso, E. Simiu, *Proceedings*, International Conference on Computational Engineering Science, Vol. 2, Sect. 44-VII, pp. 1-4 (Apr 1988).

Keywords:   dynamics, Green's function, large space structures, pulse probing.

- SD-4     **Dynamic Characterization of Structures by Pulse Probing and Deconvolution**, A.S. Carasso, E. Simiu, *Proceedings*, 29th Structures, Structural Dynamics and Materials Conference, AIAA, pp.147-157 (Apr 1988).

Keywords:   deconvolution, dynamics, Green's function, infinitely divisible pulses, structural engineering.

- SD-5     **Chaotic Motions of Forced and Coupled Galloping Oscillators**, G. Cook, E. Simiu, *Proceedings*, 6th US National Conference on Wind Engineering, Houston, TX, Vol. II, pp. C7-1--C-12 (Mar 1989).

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- SD-8      **Chaotic Behavior of Galloping Oscillators**, T. Burns, G. Cook, E. Simiu, *Proceedings*, 2nd Asia-Pacific Symposium on Wind Engineering, Vol. 1, pp. 348-361 (Jun 1989).
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Keywords: construction, cooling tower, failure, investigation.

- SI-4     **Monitoring of Dynamic Response of Floor in 'D' Wing of the Main Building, Bureau of Engraving and Printing**, F.Y. Yokel, P.W. Mayne, NBSIR 85-3126, 15 pages (Mar 1985), NTIS No. PB85-196400.

Keywords: floor vibrations, structural dynamics, structural engineering.

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Keywords: buildings, concrete, embassy, construction, investigation, masonry, Moscow, steel, structural evaluation.

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- SI-8     **Investigation into the Ashland Oil Storage Tank Collapse on January 2, 1988**, J.L. Gross, F.Y. Yokel, R.N. Wright, A.H. Fanney, J.H. Smith, G.E. Hicho, T.R. Shives, NBSIR 88-3792, 204 pages (Jun 1988), NTIS No. PB88-216601.
- Keywords: brittle fracture, collapse, failure investigation, fracture analysis, steel, tanks, welded steel tanks.
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- Keywords: buildings, construction loads, construction safety, masonry, lateral bracing, stability, timber shoring, wind loads.
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Keywords:   brittle fracture, collapse, failure investigation, fracture analysis, steel, tanks, welded steel tanks.

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# Wind Engineering

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Keywords: aerodynamics, climatology, directionality, reliability, structural engineering, wind engineering, wind speeds.

- WE-2     **Wind Loading and Strength of Cladding Glass**, D.A. Reed, E. Simiu, *Journal of Structural Engineering*, ASCE, Vol. 110, No. 4, pp. 715-729 (Apr 1984).

Keywords: analytical study, cladding glass, strength, wind loads.

- WE-3     **Turbulent Wind and Tension Leg Platform Surge**, E. Simiu, S.D. Leigh, *Journal of Structural Engineering*, ASCE, Vol. 110, No. 4, pp. 785-802 (Apr 1984).

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